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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,188	03/26/2004	Masaki Fukuchi	450100-04975	8017

7590 03/19/2008
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EXAMINER

OLSEN, LIN B

ART UNIT	PAPER NUMBER
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3661

MAIL DATE	DELIVERY MODE
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03/19/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/810,188	Applicant(s) FUKUCHI ET AL.	
	Examiner LIN B. OLSEN	Art Unit 3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in response to the applicant's reply of 15 November, 2007

Specification

The amendment to the specification was not entered because the amendment on page 3 of the response did not specify what to do with the paragraph at page 9, line 20 of Pub. Appl par [50] beginning "FIG. 30.

The disclosure is objected to because of the following informalities: On page 9, two Fig. 30's are referenced. Only one Fig 30 is present in the application. Appropriate correction is required.

Response to Amendment

The amendment to claim 5 has been entered and the rejection of claim 5 under 35 U.S.C. 101 has been withdrawn.

Allowable Subject Matter

The indicated allowability of claims 6-8 is withdrawn in view of the new rejection based on Taylor.

Rejections based on the newly cited references follow.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2 and 4 - 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Pub. No. 2005/0000543 (Taylor). Taylor is concerned with a robot vacuum with internal mapping.

Regarding **claim 1**, “A behavior controlling apparatus for controlling the behavior of a mobile robot apparatus, said behavior controlling apparatus comprising:

landmark recognition means for recognizing a plurality of landmarks arranged discretely;” - Taylor at ¶90 uses edge sensors to identify the edges of a stairway. The

discrete boundaries of the stairway are found and recognized as illustrated in Fig. 10A and 10B. The edges of the stairway are not artificial landmarks placed to delimit an area. However, the edges do define an area that requires a rule for behavior control of the robot. Programmers who create behavior control algorithms for robots are sophisticated in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to equate the edges of the stairs as landmarks since this is a simple substitution of one known element for another to obtain the known result of protecting the moving apparatus.

“landmark map building means for integrating the locations of said landmarks recognized by said landmark recognition means for building a landmark map based on the geometrical topology of said landmarks;” - Taylor, after determining the edges of a stairway, draws the line between the edges and maps it as a descending stairway ¶92 in an environment map.

“mobility area recognition means for building a mobility area map, indicating the mobility area where the mobile robot apparatus can move, from said landmark map built by said landmark map building means;” – In Taylor, the area starting at the detected edge and extending away from the center of the room is an area where the robot cannot move, hence the remaining room is recognized as where the robot can move.

“behavior controlling means for controlling the behavior of said mobile robot apparatus using the mobility area map built by said mobility area recognition means” – Using the identified descending stairway, Taylor’s robot cleans the room in a serpentine manner avoiding the detected descending stairway ¶92. Thus the room area is a free

movement area and the area beyond the stairway edge is the mobility area, in this case to be avoided.

“wherein said behavior controlling means adds said mobility area map as a virtual obstacle in an obstacle map of the environment around said robot apparatus and controls the behavior of said robot apparatus so that said robot apparatus will move only in an area determined to be a free area in said obstacle map.” – Taylor describes maintaining a map of the environment including obstacles which must be avoided. The edge landmarks are detected and the mobility areas they define are added to the environmental map as virtual obstacles and the robot avoids the mobility area as well as the obstacles ¶¶ 92 and ¶82.

Regarding **claim 2**, which depends on claim 1, “said landmark map building means integrates the landmark information recognized by said landmark recognition means and the odometric information of the robot apparatus itself to estimate the geometric positions of said landmarks and outputs said geometric positions as a landmark map.” - Taylor indicates the features on an internal map kept by the robot, ¶ 66. Further at ¶70 motion control software is used to track the position of the robot. Taylor in ¶ 122 cites the use of wheel sensors to provide for position tracking. Wheel sensors provide odometric data which is used to add information for the room map.

Regarding **claim 4**, claim 4 recites the limitations of claim 1 in method form. Claim 4 is rejected as obvious in view of Taylor for the reasons listed above.

Regarding **claim 5**, claim 5 recites the limitations of claim 1 as a computer program. Claim 5 is rejected as obvious in view of Taylor for the reasons listed above.

Regarding independent **claim 6**, - “A mobile robot apparatus including at least one movable leg and a trunk provided with information processing means, said mobile robot apparatus moving on a floor surface as the apparatus recognizes an object on said floor surface, said mobile robot apparatus comprising:” - The recitation of at least one movable leg, a trunk, floor surface and an object on said floor surface have not been given patentable weight because it has been held that a preamble is denied the effect of a limitation where the claim is drawn to a structure and the portion of the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. *Kropa v. Robie*, 88 USPQ 478 (CCPA 1951)

“landmark recognition means for recognizing a plurality of landmarks arranged discretely;” - Taylor at ¶190 uses edge sensors to identify the edge of a stairway. The discrete boundaries of the stairway are found and recognized as illustrated in Fig. 10A and 10B. The edges of the stairway are not artificial landmarks placed to delimit an area. However, the edges do define an area that requires a rule for control of the robot. Programmers who create control algorithms for robots are sophisticated in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to equate the edges of the stairs as landmarks since this is a simple substitution of one

known element for another to obtain the known result of protecting the apparatus while moving.

“landmark map building means for integrating the locations of said landmarks recognized by said landmark recognition means for building a landmark map based on the geometrical topology of said landmarks;” - Taylor, after determining the edges of a stairway, draws the line between the edges and maps it as a descending stairway ¶92 in an environment map,

“mobility area recognition means for building a mobility area map, indicating the mobility area where the mobile robot apparatus can move, from said landmark map built by said landmark map building means; and” - In Taylor, the area starting at the detected edge and extending away from the center of the room is an area where the robot cannot move, hence the remaining room is recognized as where the robot can move.

“behavior controlling means for controlling the behavior of said mobile robot apparatus using the mobility area map built by said mobility area recognition means.” - Using the identified descending stairway, Taylor’s robot cleans the room in a serpentine manner avoiding the detected descending stairway ¶92. Thus the room area is a free movement area and the area beyond the stairway edge is the mobility area, in this case to be avoided.

Regarding **claim 7**, which is dependent on claim 6, “wherein said landmark map building means integrates the landmark information recognized by said landmark

recognition means and the odometric information of the robot apparatus itself to estimate the geometric positions of said landmarks and outputs said geometric positions as a landmark map.” - Taylor in ¶ 122 cites the use of wheel sensors to provide for position tracking. This information is used for dead reckoning to add information for a room map. Further, in ¶126, the mapped room is used to identify uncleaned areas and in ¶127 a map marked with obstacles, cleaned and uncleaned areas are disclosed. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the position of landmarks as well as obstacles and cleaned areas on the map to construct a complete map.

Regarding **claim 8**, which is dependent on claim 6, “wherein said behavior controlling means adds said mobility area map as a virtual obstacle in the obstacle map of the environment around said robot apparatus and controls the behavior of said robot apparatus so that said robot apparatus will move only in an area determined to be a free area in said obstacle map.” - Taylor describes maintaining a map of the environment including obstacles which must be avoided. When edge landmarks are detected, the mobility areas they define are added to the environmental map as virtual obstacles and the robot moves freely in the area free of obstacles and landmarks while avoiding the mobility area as well as the obstacles ¶ 92 and ¶82.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIN B. OLSEN whose telephone number is (571)272-9754. The examiner can normally be reached on Mon - Fri, 8:30 -5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G. Black can be reached on 571-272-6956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LO

/Thomas G. Black/

Supervisory Patent Examiner, Art Unit 3661

